

Obtain a compressed counting range with a variable-modulus counter

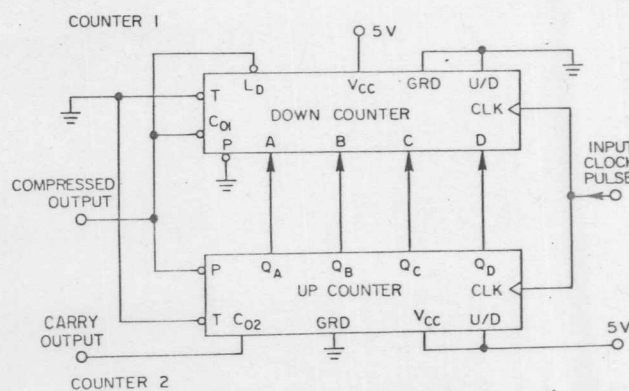
Quite frequently pulse-train inputs to programmable devices such as microprocessors exhibit wide dynamic ranges. Since, in most cases, resolution requirements at higher frequencies are not as stringent as at lower rates, a nonlinear frequency transfer function can relieve the burden on the system intelligence. A variable-modulus counter to compress the counting range can perform such a task (Fig. 1).

The circuit consists of two presettable up/down counters. Counter 1 counts in the down mode, while Counter 2 counts up. When the output of the latter resets the former, a varying-modulo counter is achieved: The modulus of the down counter becomes equal to the number previously loaded into it from the up counter.

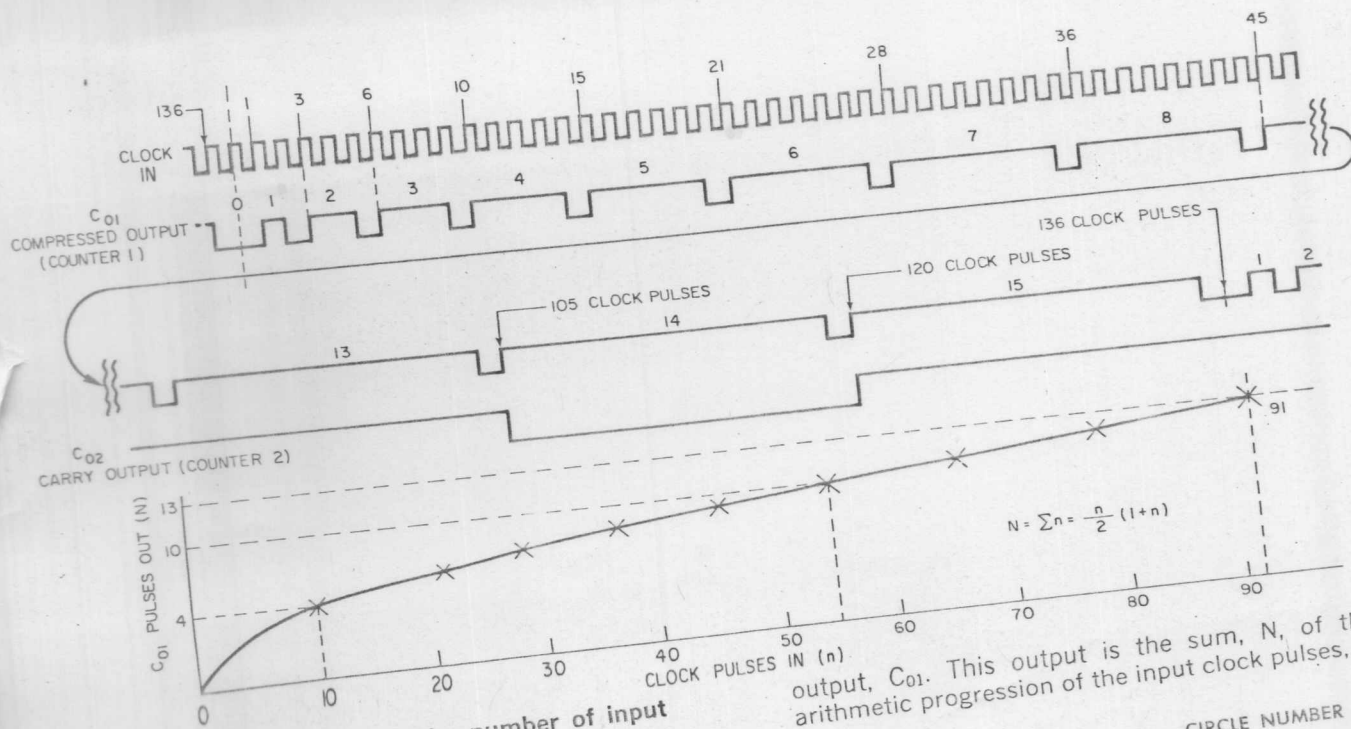
The range can be expanded either by cascading the circuit or by increasing the lengths of the counters. And various complex transfer functions can be achieved by inserting appropriate logic or a PROM between the outputs of Counter 2 and the inputs of Counter 1.

Charles B. Mitchell, Senior Engineer, National Semiconductor Corp., 2900 Semiconductor Dr., Santa Clara, CA 95051.

CIRCLE NO. 311



1. Nonlinear counting is achieved when the up counter loads the down counter and thereby determines the down-counter's modulus.



2. A compressed output of the number of input clock pulses is obtained at the down counter's carry

output, C_{01} . This output is the sum, N , of the arithmetic progression of the input clock pulses, n .

CIRCLE NUMBER 48